### List of Resolutions and Recommendations

| Resolution 1: | Locating International Meteorological Centre at Bombay. |
| Resolution 2: | Expression of Thanks. |
| Recommendation 1: | Establishment of an IIOE Meteorological Sub-Committee. |
| Recommendation 2: | Telecommunications. |
| Recommendation 3: | General circulation: Surface and Rawinsonde network. |
| Recommendation 4: | Aircraft Reconnaissance flights. |
| Recommendation 5: | General circulation: Cloud Photography. |
| Recommendation 6: | General circulation: Pilot Balloon ascents. |
| Recommendation 8: | General circulation: All-sky cameras. |
| Recommendation 10: | General circulation: Ozone. |
| Recommendation 11: | General circulation: Miscellaneous. |
| Recommendation 12: | General circulation: Miscellaneous. |
| Recommendation 14: | Speedy installation of equipment. |
| Recommendation 15: | Rainfall at sea. |
| Recommendation 16: | Climatology: Evaporation. |
| Recommendation 17: | Climatology: Radiation. |
METEOROLOGICAL PLANNING COMMITTEE OF SCOR FOR
THE INTERNATIONAL INDIAN OCEAN EXPEDITION

Res. 1: Locating International Meteorological Centre at Bombay.

THE COMMITTEE

RECOGNIZING the need for the establishment of an International Meteorological Centre

1) for the servicing and testing of the instruments for the Expedition

ii) for collecting, processing and an analyzing the meteorological data

iii) for the issue of meteorological forecasts and warnings required for the operation of oceanographic ships of the expedition

and iv) for continuing research on the data that will be gathered;

NOTING the offer of the Indian National Committee for Oceanic Research to provide utility and communication facilities for locating such a centre at the Meteorological Office, Colaba, Bombay

DECIDES a) to request the Government of India to agree to locate the International Meteorological Centre at Bombay for the duration of the International Indian Ocean Expedition and to make a request to the UN Special Fund for financial assistance for the establishment of such a centre at Bombay,

and b) to request other interested Governments to advise the U.N. Special Fund of their support of the IMC.
Res. 2. Expression of Thanks

The Planning Committee resolves to express its appreciation to the Indian Meteorological Service and the Indian Government for their hospitality and excellent arrangements in connection with the meeting.
METEOROLOGICAL PLANNING COMMITTEE OF SCOR FOR
THE INTERNATIONAL INDIAN OCEAN EXPEDITION

Rec. 1: Establishment of an IIOE Meteorological Sub-Committee.

THE COMMITTEE

NOTING the opinion of the President of SCOR and
RECOGNISING the need for close co-ordination of all
International Indian Ocean Expedition
meteorological activities.

RECOMMENDS the establishment of an IIOE Meteorological
Sub-Committee to advise the Scientific
Director for Meteorology of the IIOE and
to select the international staff for
the International Meteorological Centre;
the Sub-Committee to be composed of a
group of not more than five research meteo-
rologists of whom at least two should be
from Indian Ocean countries and the Sub-
Committee to be selected by SCOR.
Rec. 2: TELECOMMUNICATIONS

THE COMMITTEE

CONSIDERING

the question of the telecommunications necessary to achieve speedy reception of normal and special Indian Ocean meteorological data at the I.M.C. and

NOTING

the existing telecommunications facilities

RECOMMENDS (1)

that no change takes place in the methods of transmission of weather reports from merchant and naval ships to shore stations during the period of the Expedition, but all services should endeavor to arrange with their local communications authorities to improve or expedite the collection and onward transmission of reports where necessary.

(2)

That oceanographic and weather ships of the Expedition report their observations direct to the IMC by special arrangements to be made by the Indian Telecommunications authorities.

(3)

That special telecommunications links be established between Bombay and certain other major centres as set out below* to enable faster traffic handling to be achieved without interference with normal operational meteorological telecommunications requirements.

*A. Point-to-point RTT duplex links

1. Bombay-Karachi  ) 24 hours
2. Bombay-Colombo  ) operation
3. Bombay-Nairobi  ) Usage limited
4. Bombay-Bangkok  ) initially to 4
5. Bombay-Cairo    ) to 6 hours per day.
THE COMMITTEE (contd)

*B. Circuits inward to Bombay only

1. Canberra (RTT)
2. Peking  (W/T)
3. Djakarta (RTT)

(4) That arrangements be made for the reception at IMC of facsimile broadcasts of Tokyo, southern hemisphere stations and weather satellite data. Tokyo is requested to explore the possibility of sending machine analyses to the IMC.
METEOROLOGICAL PLANNING COMMITTEE OF SCOR FOR
THE INTERNATIONAL INDIAN OCEAN EXPEDITION

Rec. 3: GENERAL CIRCULATION - SURFACE AND RAWINSONDE NETWORK.

THE COMMITTEE

REALISING the importance of a description and improved understanding of the general circulation of the atmosphere to the economy and safety of human life in the region of the Indian Ocean, and

NOTING the present distribution of operational meteorological stations in countries bordering the Indian Ocean and at islands within the Ocean, and the extensions to this network proposed by these countries

RECOMMENDS (1) that the network of stations making surface synoptic observations and reporting in international meteorological circuits be increased by:

(a) the addition of the following observing stations:

Crozet Island, Heard Island and Peuros Banhos Island and MAMOS buoys in the Arabian Sea and the Bay of Bengal

(b) the extension of the programme of ships and land stations to/ all full 6 hourly synoptic observations.

(2) that the network of stations making rawinsonde observations twice daily (at 0000 and 1200 Z) and reporting in international meteorological circuits be increased by:

(a) the establishment of new stations at:

Christmas Island, Crozet Island, Diego Garcia, Heard Island, Mahe, Minicoy, Mogadiscio and Salalah.
(b) the provision of radar and wind equipment to convert the present radiosonde to full rawinsonde at the following stations:

Addis Ababa, Djakarta, Lahore, Mandalay, Mossuril, Rangoon and Visakhapatnam.

(c) the provision of radiosonde to convert the present radar wind to full rawinsonde at the following stations:


(d) that weather ships able to operate rawinsonde be established on the equator in longitudes 83° E. and 94° E.

(e) that oceanographic vessels be equipped for rawinsonde observations

(f) that all rawinsonde observations be made at 0000 and 1200 GMT.
METEOROLOGICAL PLANNING COMMITTEE OF SCOR FOR
THE INTERNATIONAL INDIAN OCEAN EXPEDITION

Rec. 4: AIRCRAFT RECONNAISSANCE FLIGHTS

THE COMMITTEE

NOTING the great importance in meteorological research of aircraft reconnaissance flights and their particular value to the programme of the Expedition

RECOMMENDS that all countries operating meteorological reconnaissance or research aircraft undertake such flights in the Indian Ocean during the period of the Expedition as frequently as possible and in coordination with the Expedition programme.
METEOROLOGICAL PLANNING COMMITTEE OF SCOR FOR
THE INTERNATIONAL INDIAN OCEAN EXPEDITION

Rec. 5: GENERAL CIRCULATION: CLOUD PHOTOGRAPHY

THE COMMITTEE

NOTING the ease with which time lapse cameras for cloud photography can be fitted to aircraft and

CONSIDERING the value of these observations

RECOMMENDS that special arrangements be made to fit these cameras to civil and military aircraft flying on routes crossing the Indian Ocean and that the exposed films be forwarded to the IMC by the met. service of the destination aerodrome.
Rec. 6: GENERAL CIRCULATION: PILOT BALLOON ASCENTS.

THE COMMITTEE

NOTING the extension of the rawinsonde network which it is hoped will be achieved during the course of the Indian Ocean Expedition nevertheless

EMPHASISES the continuing importance of pilot balloon observations throughout many parts of the area and

RECOMMENDS that all countries making pilot balloon observations seek by all means to extend their network and achieve higher flights by the use of bigger balloons with a high rate of ascent.
THE COMMITTEE

NOTING the great importance and value of satellite data and that U.S. satellites will be in orbit during the period of the Expedition

RECOMMENDS

RECORDS its appreciation of the effort the U.S. is making in this new sphere and

that the IMC ensures that the photographic results of satellites in orbits over the Indian Ocean be made regularly and rapidly available to services in the region.
METEOROLOGICAL PLANNING COMMITTEE OF SCOR FOR
THE INTERNATIONAL INDIAN OCEAN EXPEDITION

Rec. 8: GENERAL CIRCULATION: ALL-SKY CAMERAS.

THE COMMITTEE

NOTING

the importance of a network of cameras photographing over a 180° field for sky recording at surface stations

RECOMMENDS

that the network suggested below be set up for operation during the Expedition.

Singapore, two ocean weather ships on equator, Gan, Seychelles, Nairobi, Srinagar, Bombay, Ahmedabad, Minicoy, Diego Garcia, weather ship NASA, Kerguelen Island.
METEOROLOGICAL PLANNING COMMITTEE OF SCOR FOR
THE INTERNATIONAL INDIAN OCEAN EXPEDITION

Rec. 9: GENERAL CIRCULATION: STORM DETECTING RADAR.

THE COMMITTEE

NOTING the existence of storm detecting radars at the following stations:
Bangkok, Kota-Bahru, Butterworth, Singapore, Gauhati, Madras, Nagpur, New Delhi, Bombay, Karachi, Calcutta, Dacca, Entebbe, Nairobi, Dar-es-Salaam

RECOMMENDS that photographs of the radar screens be taken and made available to the IMC on request.
METEOROLOGICAL PLANNING COMMITTEE OF SCOR FOR
THE INTERNATIONAL INDIAN OCEAN EXPEDITION

Rec. 10: GENERAL CIRCULATION - OZONE

THE COMMITTEE

CONSIDERING the importance of a knowledge of the distribution of Ozone in studies of the atmosphere and

NOTING that measurements of ozone are made at New Delhi, Srinagar, Ahmedabad, Kodaikanal, Hyderabad and Quetta

RECOMMENDS that ozone sounding stations supplemented by spectrophotometer observations should be undertaken at the following additional stations

Pretoria, Salisbury, Tananarive, Mauritius, Nairobi, Bahrain, Kerguelen, NASA (Weather ship) Djakarta, Chieng Mai, Cuttack or Calcutta

REQUESTS that the IMC conduct comparison trials of the various instruments used during the period of the Expedition.
Rec. 11: GENERAL CIRCULATION - MISCELLANEOUS

THE COMMITTEE

NOTING the importance of meteorological surface and upper air stations at Mogadiscio and Salalah for describing the behaviour of the recurring monsoon and

NOTING also that unusual difficulties may be encountered in establishing these stations

RECOMMENDS that special arrangements be made if necessary.
METEOROLOGICAL PLANNING COMMITTEE OF SCOR FOR
THE INTERNATIONAL INDIAN OCEAN EXPEDITION

Rec. 12: GENERAL CIRCULATION - MISCELLANEOUS

THE COMMITTEE

NOTING that during the International Indian Ocean Expedition, some upper air soundings chiefly at sea will be made only once daily

RECOMMENDS that the time for these soundings be fixed at 0000 GMT.
METEOROLOGICAL PLANNING COMMITTEE OF SCOR FOR
THE INTERNATIONAL INDIAN OCEAN EXPEDITION

Rec. 13: GENERAL CIRCULATION: MISCELLANEOUS

THE COMMITTEE

RECOMMENDS that copies of any special meteorological observations made during the period of the Expedition should be lodged with the I.M.C.
METEOROLOGICAL PLANNING COMMITTEE OF SCOR FOR
THE INTERNATIONAL INDIAN OCEAN EXPEDITION

Rec. 14: SPEEDY INSTALLATION OF EQUIPMENT

THE COMMITTEE

NOTING

1) that the maximum effort of the Expedition will begin in the spring of 1962

(11) that long delays in the order, delivery and installation of technical equipment have occurred in the past

RECOMMENDS

that all concerned act speedily to procure and instal items of equipment required for the expedition programme.
METEOROLOGICAL PLANNING COMMITTEE OF SCOR FOR
THE INTERNATIONAL INDIAN OCEAN EXPEDITION

Rec. 15: RAINFALL AT SEA

THE COMMITTEE

NOTING the absence of a satisfactory method of measuring rainfall at sea

CONSIDERING the need for knowledge of rainfall amounts and times of occurrence

RECOMMENDS that every effort should be made to observe and record the times of occurrence, nature and intensity of precipitation especially over the open ocean.
METEOROLOGICAL PLANNING COMMITTEE OF SCOR FOR
THE INTERNATIONAL INDIAN OCEAN EXPEDITION

Rec. 16: CLIMATOLOGY: EVAPORATION

THE COMMITTEE

CONSIDERING the need for observations of evaporation from water surfaces, particularly from islands and coastal stations in the Indian Ocean

RECOMMENDS that all States establish Class A or similar evaporation pans at the most suitable location within their territory to achieve a satisfactory network.
APPRECIATING the importance of as dense a network as possible of integrating radiation recorders for the measurement of total and diffuse radiation and

NOTING the present network of radiation recorders as shown in the attached List A

RECOMMENDS that additional integrating radiation recorders be established at the surface stations indicated in List B and that all weather and oceanographic ships should be so equipped wherever possible and

REQUESTS the IMC to undertake comparisons of the various types of instruments used by each Meteorological Service in the Indian Ocean.
LIST A

(a) Stations already recording total and diffuse sky radiation.

1. Delhi  
2. Jodphur  
3. Nagpur  
4. Calcutta  
5. Madras  
6. Kodaikanal  
7. Bangalore  
8. Poona  
9. Karachi  
10. Quetta  
11. Multan  
12. Peshawar  
13. Chittagong  
14. Dacca  
15. Tananarive  
16. Entebbe  
17. Nairobi  
18. Dar-es-Salaam  
19. Several stations in South Africa

(b) Stations recording total radiation only.

1. Chiengmai  
2. Udorn rajadhani  
3. Bangkok  
4. Songkhla  
5. Singapore  
6. Mauritius

LIST B

Stations recommended to complete the Indian Ocean network

Bali:

1. Bahrein  
2. Salalah  
3. Aden  
4. Magadiscio  
5. Seychelles  
6. Diego Garcia  
7. Gan  
8. Minicoy  
9. Crozet  
10. Kerguelen  
11. Lourengo Marquez  
12. Mossuril  
13. Cocos Island  
14. Ben-Pasar  
15. Djakarta  
16. Palembang  
17. Port Blair  
18. Veraval  
20. Mangalore  
21. Visakapatnam  
22. Jiwani  
23. Nokkundi  
24. Bangpur  
25. Colombo
TABLE I

Large Scale Atmospheric Circulation and Related Studies

<table>
<thead>
<tr>
<th>Activity</th>
<th>Current Effort</th>
<th>Additional Effort to which States committed</th>
<th>*Further Effort requested by Bombay SCCH Met. meeting to meet Total Additional Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Circulation (Surface &amp; Upper Air Stations) (Recommendation 3)</td>
<td>$ 6,988,000 **</td>
<td>$ 2,329,000</td>
<td>$ 2,790,000</td>
</tr>
<tr>
<td>Radiation (Recommendation 17)</td>
<td>177,000</td>
<td></td>
<td>205,000</td>
</tr>
<tr>
<td>Ozone (Recommendation 10)</td>
<td>72,000</td>
<td></td>
<td>116,000</td>
</tr>
<tr>
<td>Storm Warning Radar (Recommendation 9)</td>
<td>1,350,000</td>
<td>270,000</td>
<td></td>
</tr>
<tr>
<td>Sky Recording (Recommendation 8)</td>
<td></td>
<td></td>
<td>13,000</td>
</tr>
</tbody>
</table>

**GRAND TOTAL FOR TWO YEARS OPERATIONS:** $ 8,587,000 $ 2,599,000 $ 3,124,000

NOTE

These figures do not include cost of weather ships, oceanographic ships or the observations (surface and upper air) which they will do. Nor do they include the cost of the MAMOS buoys or their servicing.

* Further effort not likely to be forthcoming from states themselves.

** Recurrent cost alone estimated. Owing to the different circumstances in the various states, the capital investment in coastal and island upper air and surface meteorological stations in the Indian Ocean could not be estimated with any degree of certainty; however, it is unlikely to be less than US $3,000,000 and may well be twice this figure.
<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>Estimated cost of present annual recurrent effort</th>
<th>Estimated cost of additional stations already recommended to or approved by Governments which will contribute to the Expedition</th>
<th>Estimated cost of additional effort recommended by sub-committee in Rec. 3 *</th>
</tr>
</thead>
<tbody>
<tr>
<td>British East Africa</td>
<td>45,000</td>
<td>26,000</td>
<td>35,000</td>
</tr>
<tr>
<td>Malagasy Republic</td>
<td>42,000</td>
<td></td>
<td>16,000</td>
</tr>
<tr>
<td>Mauritius</td>
<td>8,000</td>
<td>24,000</td>
<td>22,000</td>
</tr>
<tr>
<td>South Africa</td>
<td>414,000</td>
<td>72,000</td>
<td>51,000</td>
</tr>
<tr>
<td>Portugal (Mozambique)</td>
<td>138,000</td>
<td>48,000</td>
<td>37,000</td>
</tr>
<tr>
<td>Somalia</td>
<td>140,000</td>
<td>30,000</td>
<td>463,000</td>
</tr>
<tr>
<td>Arabian Penin. &amp; Gan</td>
<td>248,000</td>
<td></td>
<td>150,000</td>
</tr>
<tr>
<td>Pakistan</td>
<td>880,000</td>
<td>200,000</td>
<td>55,000</td>
</tr>
<tr>
<td>India</td>
<td>18,000</td>
<td>30,000</td>
<td>70,000</td>
</tr>
<tr>
<td>Malaya &amp; Singapore</td>
<td>30,000</td>
<td>60,000</td>
<td>70,000</td>
</tr>
<tr>
<td>Indonesia</td>
<td>90,000</td>
<td>95,000</td>
<td>69,000</td>
</tr>
<tr>
<td>Australia</td>
<td>345,000</td>
<td>240,000</td>
<td>345,000</td>
</tr>
<tr>
<td><strong>CAPITAL TOTAL</strong></td>
<td>588,000</td>
<td>98,000</td>
<td>2,537,000</td>
</tr>
<tr>
<td><strong>ANN.RECURRENT TOTAL</strong></td>
<td>2,329,000</td>
<td>2,790,000</td>
<td>2,537,000</td>
</tr>
</tbody>
</table>

* Not itemized by countries because of incomplete representation at Bombay meeting.
### SUMMARY

**INDIAN OCEAN RADIATION STATION EFFORT**  
Recommendation 17.

(All figures in US Dollars)

<table>
<thead>
<tr>
<th></th>
<th>Current Effort</th>
<th>Further effort requested by SCOR Bombay Meeting (Recommendation 17)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Capital</td>
<td>Annual Recurrent</td>
</tr>
<tr>
<td>Measurement of Total Radiation only</td>
<td>18,000</td>
<td>6,000</td>
</tr>
<tr>
<td>Measurement of Diffuse Radiation only</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurements of Total and Diffuse Radiation</td>
<td>105,000</td>
<td>21,000</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>123,000</td>
<td>27,000</td>
</tr>
</tbody>
</table>

GRAND TOTAL FOR TWO YEARS OPERATIONS:  
177,000  205,000
**INDIAN OCEAN OZONE STATION EFFORT** - Recommendation 10

(All figures in US Dollars)

<table>
<thead>
<tr>
<th></th>
<th>Current Effort</th>
<th>Recommended Network</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Capital</td>
<td>Annual Recurrent</td>
</tr>
<tr>
<td></td>
<td>36,000</td>
<td>18,000</td>
</tr>
</tbody>
</table>

**GRAND TOTAL FOR TWO YEARS OPERATIONS:**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>72,000</td>
<td>116,000</td>
</tr>
</tbody>
</table>
ADDITIONAL SURFACE SYNOPTIC STATIONS
Rec.3 (1a)
ALL-SKY CAMERA AND STORM-DETECTING RADAR STATIONS

Rec. 8, 9

[Map of proposed and existing stations across various continents, including cities like Bombay, Srinagar, Ahmedabad, Minicoy, Singapore, Diego Garcia, and Kerqueilen Is.]

+ PROPOSED ALL-SKY CAMERAS

○ EXISTING STORM-DETECTING RADAR